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Preface

This special volume of Discrete Mathematics contains articles that were presented at the Fourth Slovenian Graph Theory Conference and were accepted for publication after a thorough refereeing process. The conference was held from June 28 to July 2, 1999 at Lake Bled, Slovenia, a beautiful and peaceful vacation resort in Julian Alps. This conference series made a long way from the first meeting in Dubrovnik (now in Croatia) in 1985, organized by Tomaž Pisanski, one of the pioneers of Graph Theory in Slovenia, whose 50th anniversary along with the 70th anniversary of Gert Sabidussi was celebrated during this conference. Several articles in this collection are dedicated to one or the other of these two graph theorists whose influence on development of Graph Theory in Slovenia is still visible today.

The special themes of the conference were Algebraic and Topological Methods in Graph Theory, with an emphasis given to covering aspects of graph automorphisms and homomorphisms, transitivity in graphs, Cayley graphs, eigenvalues, distance-regular graphs, discrete geometry, polytopes, graph products, graphs on surfaces, maps and regular maps, graph minors, planarity of graphs, graph drawing, etc.

This collection contains forty-four research articles. Twenty-one of them fall into the category of algebraic graph theory and graph products, eleven belong to topological graph theory, while the remaining twelve contributions cover some other areas of graph theory and combinatorics.

We would like to thank all the participants as well as the authors of the articles in this volume. We are most grateful to the Ministry of Science and Technology of Slovenia, to the Institute of Mathematics, Physics and Mechanics, Ljubljana, and to several high-tech companies in Slovenia for their financial support. Our thanks also go to the entire Slovenian research group in Graph Theory and Discrete Mathematics and to our graduate students. Organizing the conference and putting this volume together would have been a much more difficult task without their help.

While the editorial work for this volume was in its final stages, we received the sad news of Prof. Crispin Nash-Williams' death. The 1999 Bled conference was probably one of the last he attended as an invited speaker. His opening lecture "An application of network flows to rearrangement of series" in which he brought together ideas from combinatorics and analysis is still very much alive in our memories and will remain so for a long time to come. We were honoured and delighted that he could participate, especially as he had been unable to make it to the two earlier conferences in 1991 and 1995. We feel that his attendance was also a reflection of his pleasure at the

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flourishing of graph theory in Slovenia, for which, as he used to say, he was at least partly responsible.

We would like to dedicate this volume to his memory.

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In memoriam

Some personal impressions of Crispin Nash-Williams

I remember very clearly that first Friday of October 1977 when I walked into Prof. Nash-Williams' office. As a fresh postgraduate student at the University of Reading, I was probably more concerned with how to survive the cultural shock I had been going through, than with my immediate mathematical future. He struck me as a warm albeit somewhat reserved person, and I can recall thinking that I had made the right decision in choosing Reading as the next step in my pursuit of a mathematical career. Coming from the University of Ljubljana with a very strong tradition in mathematical

analysis, my decision to do postgraduate work in combinatorics had not been well received in all quarters. But if I was still harbouring any feelings of guilt about having deserted classical mathematics in favour of something as mundane as graph theory and combinatorics, they were dispelled by the following passage from the introduction to his 1970 article *A survey of graph theory* in the Proceedings of Louisiana Conference on Combinatorics, Graph Theory and Computing:

"I should like to begin by indicating why I personally developed an interest in graph theory when it became necessary to select an area of mathematics as a research subject. If one considers the objects studied in many other branches of mathematics—groups, rings, modules, vector spaces, topological spaces, fibre bundles, differentiable manifolds, projective spaces, measure spaces, topological groups, Lie groups, etc.—it is difficult to escape the impression that most if not all of them are of a very specialized kind. Generally speaking, such objects involve an underlying set and a structure on that set which is required to satisfy, perhaps, some five or ten or fifteen axioms. Moreover, the latter are not necessarily the simplest five or ten or fifteen axioms which it might be feasible to formulate. Limiting oneself to the study of a mathematical object defined in this kind of way might seem at first sight to be imposing a severe restriction on the generality of one's mathematical work and giving it a very strong, and perhaps even somewhat arbitrary, bias. It seemed to me that one might be able to develop equally good if not better mathematics by taking as one's starting point a much simpler concept, preferably the simplest one could devise".

So it proved for me with graph theory, though with the addition of a touch of group theory as it transpired later on. In particular, during our very first meeting he mentioned, among other possible research questions, the famous Lovasz problem on hamiltonian paths in vertex-transitive graphs, the problem that has to a great extent shaped my mathematical interests to this very day, making vertex-transitive graphs my favourite research topic. Between my more or less regular bi-weekly meetings with Prof. Nash-Williams, I was trawling quite indiscriminately through article after article, trying to digest everything that dealt with the concepts of hamiltonicity or vertex-transitivity of graphs.

Initially, our meetings reflected a rather complex relationship between a reserved professor and not exactly the most extrovert student, giving it at times almost zen-like features where no unnecessary words were spoken, with many questions I was not at ease to ask, for which, of course, he would offer no hints or answers. But he more than made up for this lack of words in his written feedback. At some point, my mathematical enthusiasm and the long hours spent in the library started to pay off and I would eagerly begin bringing drafts of my work to these meetings. To my great frustration, no matter how hard I tried, the drafts of my work would always come back with a pile of paper twice as thick, containing his comments that ranged from small grammatical points to complete rewritings of proofs.

Over time our meetings grew more relaxed, which in turn helped to alleviate some of these frustrations. I even began to appreciate his fine sense of humour that was indeed only manifested on rare occasions. But I continued to be left in the dark regarding a

more concrete evaluation of my work. Around the beginning of my third year, I finally plucked up the courage to ask him just where I stood with regard to the completion of my Ph.D. requirements. His answer still rings in my ears: "Well, your work does contain some substantial mathematics". Not knowing what to make of it—I remember thinking that it presumably meant "good", but whether it meant "good enough" that I could not say for sure—I decided to let it rest for a while. A month or so later, a slight but significant change occurred in our relationship. The letter containing his comments to a draft of my thesis began with "Dear Dragan" instead of the usual "Dear Mr. Marušič". It was about at that point that I reached the conclusion that taken together, this must mean that as far as my thesis was concerned I would be alright. Of course, I continued to address him as Prof. Nash-Williams and many years would pass before I actually started to call him by his first name.

About a year later, my work had finally reached a form that could be presented to a Ph.D. committee. In particular, I see the fact that at last the length of his comments did not exceed the length of my last draft as one of my greatest mathematical achievements. I successfully completed all the Ph.D. requirements in the Spring of 1981, making me number 6 (in chronological order) out of his 10 Ph.D. students. I returned to Reading a year later to work with him on a one year postdoctorship, and then went to the United States where I spent the better part of the 1980s, before finally settling down at the University of Ljubljana.

In the 1990s, I came back to Reading a few times to give a talk at the Combinatorics seminar, and of course, I would continue seeing Prof. Nash-Williams at various combinatorial conferences. But it was not until 1999 that we again got the opportunity to spend some more time together. I was delighted when he accepted an invitation to give a plenary lecture at the Fourth Slovenian Graph Theory Conference. It gave me the opportunity to show him around Slovenia, while making plans for his future visits. Unfortunately, life has taken a different turn making his first visit to Slovenia also his last.

Reflecting on my mathematical career, I keep thinking just how privileged I was to have had him as a supervisor. Those three years greatly influenced my mathematical views. His simple rule that one should not submit an article for publication before really exhausting all the relevant ideas, as hard as it is to follow these days, is a constant reminder of the futility of today's hunt for quantity as opposed to substance in mathematical (and more generally scientific) research. It has been equally hard if not harder to follow his example while supervising Ph.D. students of my own.

I have kept the last draft of my thesis together with his comments as a reminder of his deep understanding of mathematics, his high moral standards and his impeccable supervising—and a token of gratitude for everything that Crispin taught me.

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